

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 08/00/78		3. REPORT TYPE AND DATES COVERED
4. TITLE AND SUBTITLE CALGON PLAN TROUBLESHOOTING AND CONTINGENCY PLAN AT ROCKY MOUNTAIN ARSENAL			5. FUNDING NUMBERS	
6. AUTHOR(S) PRUSINSKI, D.				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ROCKY MOUNTAIN ARSENAL (CO.) COMMERCE CITY, CO			8. PERFORMING ORGANIZATION REPORT NUMBER 81324R06	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) THIS PLAN HAS A TWO-FOLD PURPOSE: 1. TO ASSURE THE PROPER COURSE OF ACTION IS CLEARLY KNOWN IN CASE OF A CONTINGENCY ARISING AT THE NORTH BOUNDARY TREATMENT SYSTEM, AND 2. TO GIVE THE PLANT OPERATOR ON DUTY A GUIDE TO DETECT AND CORRECT QUICKLY AND ACCURATELY ANY PLANT AND/OR PLANT APPURTENCY MALFUNCTION. THE FORMAT IN BOTH CASES STARTS FROM (1) AN OBSERVATION, GIVES (2) A MOST LIKELY CAUSE FOR THE OCCURRENCE, INDICATES (3) ACTION TO BE TAKEN AND THE BEST ORDER, AND TELLS (4) WHERE THE INSTRUMENT, SWITCH, PERSONNEL CAN BE LOCATED. 19950125 131				
14. SUBJECT TERMS TREATMENT, DISPOSAL, EQUIPMENT			15. NUMBER OF PAGES	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

original
81324R06

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CALGON PLANT TROUBLESHOOTING AND CONTINGENCY PLAN

AT

ROCKY MOUNTAIN ARSENAL

81324R06
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Supporting Program Under ITARMS 1.05.12

By

Process Development and Evaluation Division of
The Contamination Control Directorate

Rocky Mountain Arsenal
Information Center
Commerce City, Colorado

ROCKY MOUNTAIN ARSENAL
Commerce City, Colorado 80022

AUGUST 1978

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GENERAL INSTRUCTIONS

PURPOSE:

This document is intended to establish procedures to be used in dealing with abnormal events regarding the North Boundary Pilot Treatment System.

RESPONSIBILITIES:

The R.M.A. Fire Prevention Division has been designated the point of contact for reporting all incidents regarding the operations of the North Boundary Pilot Treatment System.

The Security personnel will normally report any alarm lights, smoke, fire or unusual noises which occur during patrol of the North Boundary Area around and including the Carbon Adsorption Treatment Plant which fall outside their scope of operations.

SPECIFIC RESPONSIBILITIES:

The Fire Prevention Division will:

- (1) Be aware of plant equipment operations.
- (2) Have a copy of the plant S.O.P. (Troubleshooting and Contingency Plan).
- (3) Investigate alarms and/or malfunction indications.
- (4) Shut down and/or adjust the plant operations as necessary.
- (5) Perform any other corrective actions as necessary.
- (6) Keep list of Contamination Control personnel to contact.

WHO CLARENCE INSTRUCTED 8

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INTRODUCTION

This plan has a two-fold purpose: (1) to assure the proper course of action is clearly known in case of a contingency arising at the North Boundary Treatment System, and (2) to give the plant operator on duty a guide to detect and correct quickly and accurately any plant and/or plant appurtenance malfunction.

The format in both cases starts from (1) an observation, gives (2) a most likely cause for the occurrence, indicates (3) the action to be taken and the best order, and tells (4) where the instrument, switch, personnel can be located.

The two-fold purpose is reflected in the plan being broken into two sections: (1) Calgon Plant Operations Troubleshooting Guide, and (2) Calgon Plant Contingency Guide. The first of these two sections starts with malfunction occurring at the dewatering wells and progresses first to the Calgon Plant then to the recharge wells. The second section starts with the more probable contingencies and progresses to the less probable contingencies. The format style used should be the most expedient method in conveying clearly and accurately to the reader trouble shooting and contingency information on the North Boundary Treatment System.

Thus it can be seen the two-fold purpose of this plan (1) assures the proper course of action is known in case of a North Boundary Treatment System contingency, and (2) gives the plant operator a guide for an accurate and quick correction of any Calgon Plant contingency and/or plant equipment malfunction.

USE OF GUIDE

1. Determine whether problem is a plant or plant equipment failure, or if problem concerns a contingency which is not necessarily due to malfunctions of plant equipment and/or appurtenances. These observations of problems and/or serious faults which might be in either section, are listed in both sections to avoid confusion.
2. Go to the "Observation" column in the section chosen which is most closely associated to that which has occurred, and then proceed opposite thereto to the "Probable Cause" column.
3. Either make an action based on the probable cause given in the "Probable Cause" column or continue to the "Action to be Taken" column.
4. Perform the action given in the "Action to be Taken" column using the "Area of Response" information to locate switches, controls and/or personnel to be contacted.

TROUBLE SHOOTING OPERATIONAL MALFUNCTIONS

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
1. Red light on power pole by dewatering well.	Pump malfunction.	Turn off pump (if on) notify Geohydrology Personnel.	Power switch on pump pole, Don Cook or Brian Anderson, X366
2. Arcing of electricity and/or fire in dewatering well pit.	Electrical short.	Turn dewatering pump off, extinguish with electrical type fire extinguisher (if possible), notify Fire Department and personnel at Geohydrology.	Power switch on pump pole, Ray Pimple, FD, X223, Don Cook, Brian Anderson, Geo., X366.
3. Dewatering well pump makes sound like tearing paper.	Pump cavitation. Water level extremely low.	Shut off pump immediately. Notify Geohydrology.	Power switch on pump pole, Don Cook, Brian Anderson, X366.
4. Dewatering well pump runs continuously output to feed sump at below normal levels.	Broken or leaky line between Calgon plant sump and dewatering wells.	Notify Geohydrology of observation.	Don Cook or Brian Anderson, X366.
5. Feed sump pump runs continuously, feed sump above high level point.	High level sensor (in sump) non-functional.	Turn off dewatering wells, notify Calgon personnel.	Gray power box on East wall, Joe Allen, AC 713-682-1301.
6. Feed sump pump runs continuously, low level in feed sump, no flow thru plant.	Loss of prime to sump pump and/or Low Level Sensor non-functional.	Raise sump level, reprime and start pump (if possible). Contact Calgon personnel if problem persists.	Sump pump switch in front of pumps, Joe Allen, AC 713-682-1301.
7. Pump making sound like tearing paper (cavitation).	Prime lost and/or air mixed with water at sump pump input.	Shut off pump, contact Calgon's Houston Office.	Joe Allen, AC 713-682-1301.

TRUBLE SHOOTING OPERATIONAL MALFUNCTIONS

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
8. No feed water from dewatering wells.	<p>1) Main breaker at Calgon plant off.</p> <p>2) Dewatering wells shut off at Calgon plant panel box.</p> <p>3) Breakers are off at individual wells.</p> <p>4) Individual start buttons at dewatering wells off.</p>	<p>1) Reset breaker.</p> <p>2) Restart wells.</p> <p>3) Reset breakers, stand by to manually shut off pump(s) if cause due to dewatering pump malfunction.</p> <p>4) Check with Geohydrology to see if pump was shut off. If pump was not to be shut off, restart pump.</p>	<p>1) Large panel box in S.E. corner Calgon Plant.</p> <p>2) Smaller panel box S. of truck door.</p> <p>3) Breaker found in dewatering well pit.</p> <p>4) Switch on power pole nearest dewatering well.</p>
9. Low feed rate to feed sump.	<p>1) Metered feed from well too low.</p> <p>2) Motor(s) are off to some wells.</p> <p>3) Motor(s) to some wells are non-operational.</p> <p>4) 3-way valve in bypass position.</p> <p>5) Manual valves closed.</p> <p>6) Backwash level control and/or relay inoperable.</p>	<p>1) Increase flow from dewatering well.</p> <p>2) Restore power to motor(s).</p> <p>3) Restore motor(s) to operation (replace or repair).</p> <p>4) Return 3-way valve to normal position.</p> <p>5) Open manual valve only after contact with Geohydrology.</p> <p>6) Repair and/or replace level control and/or relay.</p>	<p>1) Dewatering well meter in well pit.</p> <p>2) Switch on power pole nearest well.</p> <p>3) Don Cook, Geohydrology, X366.</p> <p>4) Valve located in well pit.</p> <p>5) Well pit of dewatering wells. Don Cook, Brian Anderson, X366.</p> <p>6) Control panel in front of filters.</p>

TROUBLE SHOOTING OPERATIONAL MALFUNCTIONS

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
10. No feed to plant.	<p>1) Low feed sump level.</p> <p>2) Plant feed pump lost prime.</p> <p>3) Pump cavitated.</p>	<p>1) Raise feed sump level with plant pumps off, start plant pumps (see low feed to plant section).</p> <p>2) Try to start after raising feed sump level; if unable to do so, prime by hand.</p> <p>3) Shut off pump if running, initiate repair procedures.</p>	<p>1) Blue control box next to truck door and controls in front of plant pumps.</p> <p>2) Blue control box, prime port on rear of plant pump, controls to plant pumps.</p> <p>3) Controls in front of feed pumps and control box in S.E. corner of Calgon plant.</p>
11. No flow thru plant.	<p>1) No feed to plant.</p> <p>a. No outlet pressure from pump (no flow thru pump).</p> <p>b. Outlet pressure at pump but no inlet pressure to filters.</p> <p>2) No flow thru filters (outlet pressure of filters near or at zero).</p> <p>3) No flow thru Adsorber.</p> <p>a. Outlet pressure near or at zero and totalizer not moving.</p>	<p>1)a See previous section.</p> <p>1)b Valve closed between feed pump and filters and/or piping broken.</p> <p>2) Shut off control panel and wait 30 mins. for valve to return to normal position, may have to run sequencer thru Steps T6 & T7 on Backwash Cycle.</p> <p>3)a Normal if backwash cycle being done, otherwise check to see manual valves are in correct position.</p>	<p>1)a As indicated in previous section.</p> <p>1)b Open valve slowly or replace broken pipe.</p> <p>2) Gray control box at N.E. corner Calgon Plant (marked CP-196 & CP-199).</p> <p>3)a Valve levers in front of Adsorbers.</p>
Cont'd			

TROUBLE SHOOTING OPERATIONAL MALFUNCTIONS

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
11. No flow thru plant. (Conc'l)	3) No flow thru Adsorber. b. Adsorber outlet pressure normal but totalizer not moving	3)b Valve outside plant closed and/or totalizer has malfunctioned.	3)b Open valve slowly, check at blue control panel at West wall.
	4) Main breaker off.	4) Reset main breaker.	4) Gray power box in S.E. corner of Calgon Plant.
12. No flow to recharge wells.	1) Valve off between recharge wells & Calgon Plant.	1) Open valve slowly.	1) Large wheel-type handle on exterior of Calgon Plant West wall.
	2) Broken pipe between Calgon Plant & recharge wells.	2) Contact Geohydrology personnel.	2) Don Cook or Brian Anderson, X366.
	3) Flow shut off at recharge wells.	3) Contact Geohydrology personnel.	3) Don Cook or Brian Anderson, X366.
13. Settling sump too high, overflowing tank walls.	Backwash cycle stuck in drain position, auto decant control malfunction.	Lower feed sump, decant with decant pump, shut off backwash operation.	Pump controls in front of plant pump bank, and control panel off button in front of filters.
14. Settling sump too low (lower than low level sensor) decant pump running.	Low level sensor and/or relay failed to shut off decant pump.	Shut off decant pump, repair and/or replace sensor and/or relay.	Pump controls in front of plant pump bank.

CONTINGENCIES IN OR AROUND CALGON PLANT

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
<u>Electrical</u> NOTE: All electrical lines, irregardless of switch setting (on or off), should be handled as if the lines were hot.			
1. Electrical power line down.		1. Assure area clear of people around downed line, notify Fire Dept.	1. FD X223, pole phone located 1000 yds SO. of Calgon Plant.
2. No electrical power to equipment:			
a. Arcing evident.	a. Short in lines or power box.	a. Stay clear, notify Fire Dept.	a. FD X223, pole phone located 1000 yds SO. of Calgon Plant.
b. No power in any position.	b. Open circuit.	b. Set to OFF position, notify Fire Dept.	b. Same as a. above.
3. Arcing across power line or to equipment.	3. Low resistance path formed.	3. Stay clear, notify Fire Dept.	3. Same as 2a above.
4. Circuit breaker or fuse blown in power box.	4. Amperage flow exceeded circuit capacity.	4. Determine cause for tripping of breaker, reset once problem solved.	4. Notify electricians for check, reset at power box.
5. Electrical malfunction of control panel (control panel reading does not reflect true condition).	5. Integrated circuit malfunction.	5. Notify Calgon's Houston Office.	5. Joe Allen, AC 713-682-1301.
6. Other electrical problems not covered in 1-5.		6. Log improper condition as to nature and location, notify Calgon's Houston Office.	6. Same as 5 abv.

CONTINGENCIES IN OR AROUND CALGON PLANT

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
<u>Leaks and/or rupture of water lines</u> 1. Fluid spraying or falling on electrical connections and/or power lines. 2. Fluid spraying or leading on non-hazardous area. 3. Flooding w/electrical hazard. 4. Flooding, no electrical hazard.	Pressure exceeded pipe or seal strength, defective materials.	See 1. below. 1. Shut off power to area, close valves going to and from pipe or vessel, contact Calgon's Houston Office. 2. Close valves going to and from pipe or vessel, contact Calgon's Houston Office. 3. Shut off power to area concerned, contact Calgon's Houston Office, stop source of flooding. 4. Contact Calgon's Houston Office, stop source of flooding.	See 1. below. 1. Power boxes on Calgon Plant East wall and individual equipment switches, Joe Allen, AC 713-682-1301. 2. Joe Allen, AC 713-682-1301. 3. Same as 2 abv. 4. Same as 2 abv.
<u>Leaks and/or Ruptures of Airlines</u> 1. Hissing heard only at high pressures. 2. Continuous hissing, compressor pump runs continuously, tank will not build up pressure.	1. Minor leak in air lines or fittings. 2. Major leak and/or rupture of air lines and/or tank.	1. Note location of leak, fix if possible otherwise contact Calgon's Houston Office. 2. Shut off compressor, log extent of damage, contact Calgon's Houston Office.	1. Joe Allen, AC 713-682-1301. 2. Power box in S.E. corner Calgon plant, Joe Allen AC 713-682-1301.

CONTINGENCIES IN OR AROUND CALGON PLANT

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
<u>Leaks and/or Ruptures of Air Lines</u> 3. Serious rupture of air lines and/or compressor tank. a. With injuries to personnel. b. No injuries to personnel.	3. High level shut off activator and safety bypass failures. a. Flying metal fragments.	a. Perform immediate First Aid, contact Fire Dept, shut off compressor, contact Calgon's Houston Office. b. Shut off compressor, contact Calgon's Houston Office.	a. Ray Pimple, FD, X223, Joe Allen, AC 713-682-1301, Power box in S.E. corner Calgon Plant. b. Power box in S.E. corner Calgon Plant; Joe Allen, AC 713-682-1301.
<u>Fire</u> 1. In Calgon Plant. 2. Outside or on exterior of Calgon Plant.	1. Electrical malfunction, breakers fail to operate. 2. Lightning, brush fire.	1. Extinguish if possible with proper type of fire extinguisher, otherwise close doors & windows, shut off plant power, contact Fire Dept. 2. Extinguish if possible, otherwise contact Fire Dept.	1. Extinguisher on SO wall of Calgon Plant near pumps, Ray Pimple, FD, X223, pole phone 1000 yds SO of plant. 2. Same as 1.
<u>Other Contingencies</u> 1. Alarm bell sounds in Plant and/or red light is on in S.E. corner of Calgon Plant, exterior. Cont'd.	1. Filter plugged.	1. Contact plant operator during duty hours or Fire Dept. during non-duty hours. Manual backwash should be performed.	1. Dennis Prusinski, Mike French, X310; Ray Pimple, FD, X223.

CONTINGENCIES IN OR AROUND CALGON PLANT

OBSERVATION	PROBABLE CAUSE	ACTION TO BE TAKEN	AREA OF RESPONSE
<u>Other Contingencies</u>			
2. Off-scale reading of Adsorber Differential Pressure (GT 15psi or 100%).	2. Adsorber plugged and/or saturated.	2. Shut off feed sump to plant, shut off dewatering wells, notify plant operator (duty hours) or Fire Dept (non-duty hours).	2. Dennis Prusinski, Mike French, X 310; Ray Pimple. FD, X223.
3. Mechanical damage to plant and/or equipment.			
a. Personal risk likely to occur.	a. Unsafe plant supports, electrical lines shorting, etc.	a. Survey damage at an assured safe distance, notify Fire Dept.	a. Ray Pimple, FD, X223.
b. No personal risk or hazard to be encountered.	b. Windows broke, support of plant equipment loose, small hole in wall, etc.	b. Survey and log damage, notify plant operator or Fire Dept.	b. Note in Calgon Log Book in green cabinet on West wall of Plant, Ray Pimple, FD, X223.
4. Severe weather (tornado, flood, thunderstorm, etc.)	4. Not known.	4. Take Weather Bureau precaution, return upon cessation for damage survey, notify plant operator or Fire Dept.	4. Dennis Prusinski, Mike French, X310; Ray Pimple, FD X223.